endemic to India. The tribe Zonitini is entirely endemic.

As should be expected, a high percentage *c.* 27 per cent constitute the Oriental element. In Palaearctic realm, about 8 per cent of the species have so far been recorded. The Ethiopian element is rather very poorly represented and constitute about 3 per cent of the total fauna. It is interesting to note the complete absence of Nearctic, Neotropical and Australian species in India. Besides, none of the species is widespread.

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19. ON SOME INSECTS ASSOCIATED WITH LAC IN INDIA

INTRODUCTION

The lac insect, *Kerria lacca* (Kerr) (Tachardiidae, Homoptera, Hemiptera) thrives on the sap of numerous host plants, and is, in its turn, attacked by a number of parasites and predators. Glover (1934, 1937) recorded 4 encyrtid, 1 eupelmid, 2 apheliniid and 1 eulophid parasites and 2 major predators of the lac insect. Varshney (1976) has not reported any of the insects mentioned in this paper.

The parasitic insects listed in this paper were collected from fresh mature lac caged in specially fabricated cages dark-lined inside except at the holes for fitting glass tubes to study the insects associated with lac insect. The collections were made at the Indian Lac Research Institute, Namkum, Ranchi and its Regional Stations at Kundri (District Palamau, Bihar), Mirzapur (Uttar Pradesh) and Damoh (Madhya Pradesh) as stated against the insects.

OBSERVATIONS AND DISCUSSION

1. **Apanteles angaleti** Muesbeck (Hymenoptera: Braconidae)

Seven specimens (5 ♀♀ and 2 ♂♂) were collected from mature *katki** 1968 crop on *palas* or flame of the forest [*Butea monosperma* (Lam.) Taub.] (Leguminosae: Papilionatae) from Rajnagar (located about 10 km from Damoh in the Forest Compartment No. 107 of the Reserve Forest of Damoh Range, Damoh Forest Division), Damoh.

Two species of the genus *Apanteles,* namely, *A. tachardiae* Cam. and *A. fakhrulhajiae* Mahd., have long been known as endo-parasites on the larvae of *Holcocera pulverea* Meyr. (Lepidoptera: Blastobasidae), a major predator of the lac insect (Mahdihassan 1925). Hence *A. angaleti* was also presumed to be a parasite of *H. pulverea.* In order to confirm this view, 25 cocoons spun over the dead larvae of *H. pulverea* were collected from the

caged lac and the emergence of 18 specimens of *A. tachardiae,* 3 of *A. fakhrulhajiae* and 4 of *A. angaleti* were noted. Hence this is the first record of *A. angaleti* as an endo-parasite of *H. pulverea.*

A. angaleti was first recorded by Narayanan *et al.* (1953) from the environs of New Delhi and subsequently from a number of other places in India. According to these authors, it is an internal larval parasite of the pink bollworm, *Pectinophora gossypiella* Saunders of cotton and appears to be a very efficient and potential parasite in the important cotton growing tracts of India. Charpentier (1956) reports utilization of this parasite as a biotic agent in Louisiana for controlling sugarcane borer. Muesbeck (1956) reports the release of this parasite in Texas against *P. gossypiella* on cotton, and Narayanan *et al.* (1959) report shipment of several thousands of *A. angaleti* to the United States of America for release against *P. gossypiella.*

2. **Tyndarichus** sp. (Hymenoptera: Encyrtidae)

Four specimens were collected from the mature *katki* 1968 crop on *palas* at Mirzapur and numerous specimens from mature *katki* 1969 crop on *bhalia* [*Moghania macrophylla* (Willd.) O. Ktze.] (Leguminosae: Papilionatae) at Namkum and on *palas* at Kundri.

According to Subba Rao, species of *Tyndarichus* Howard are exclusively hyperparasitic on eggs or larvae of lepidopterous pests, very rarely associated with coccids (personal communication). He (1967) has described from India *T. hemiaspidoproctis* reared from *Hemiaspidoproctus cinareus* (Greene) (Coccidae). Thompson (1953) records *Porthetria dispar* L. (Lepidoptera: Lymantriidae) as a host of *Tyndarichus* sp.; *Ooencyrtus kuvanae* How. (Hymenoptera: Encyrtidae) and *P. dispar* L. (Lepidoptera: Lymantriidae) of *T. navae* How.; *Cerambyx cerdo* L. (Coleoptera: Cerambycidae) of *T. rudnevi* Newicki and *Eupithecia castigata* Hb. (Lepidoptera: Geometridae) of *T. scaurus* Wlk. Eady (1960), while describing the new species of *T. clavatus* sp. nov. and *Pseudolitomastix nacoleiae* sp. nov. (Hymenoptera: Encyrtidae); reared *T. clavatus* sp. nov., a hyperparasite of *Nacoleia octasema* Meyr. (Lepidoptera: Pyralidae), from *P. nacikeuae* sp. nov. from New Guinea. De Santis (1967) has reported *T. silvicola* from San Pedro (Argentina).

Since the lac insect is attacked by two major lepidopterous predators namely., *Eublemma amabilis* Moore (Noctuidae) and *H. pulverea* Meyr. (Blastobasidae), it is possible that *Tyndarichus* sp. recorded here occurs either as parasite of the lac insect itself or as a hyperparasite of one or both of these predators.

3. **Thomsonisca** sp. (Hymenoptera: Encyrtidae)

Six specimens were collected from mature *katki* 1969 crop on *palas* at Kundri.

So far, *T. indica* Hayat has been reared from *Aonidiella orientalis* Newst. (Coccidae) on *Ficus* sp. at Aligarh (Hayat 1970). Outside India, *T. typica* (Merc.) has been recorded by Benassy (1961) from Southern France parasitizing *Aulacaspis rosae* (Beh) (Coccidae) infesting raspberry; *T. chionaspidis* Heq. by Hoffer (1959) from Prague and *T. chinaspis* sp. n. on *Chionaspis salicis* Hem. (Coccidae) by Heqvist (1958) from Sweden.

Since *Thomsonisca* sp. has been recorded on various coccids as stated above, it is believed that this species is also parastic on the lac insect together with other encyrtid parasites. The actual role of this parasite is not known.

4. **Camptoptera** sp. (Hymenoptera : Mymaridae)

Four specimens were collected from mature

katki 1969 crop on *palas* at Kundri.

So far, *C. papaveris* Soyka and *C. magna* Soyka have been recorded from Holland (Soyka 1946); *C. loretoensis* Oglobin, *C. missionica* Oglobin, *C. reticulata* Oglobin and *C. angustipennis* Oglobin from Argentina (Oglobin 1947); *C. aula* Deb. from Belgium (Debauche 1948); *C. ellifranzae* Str. from Germany (Strassen 1950); *C. lapponica* Heq. at Sweden (Heqvist 1954); *C. strobilicola* Heq. from Norway (Heqvist 1956), and *C. pechlaneri* Soyka, *C. cardui* Foerst and *C. stammeri* Soyka by Annecke and Dout (1961).

The association of Mymaridae with lac is a new record and its role is yet unknown.

5. **Scatopse** sp. (Diptera : Scatopsidae)

Two specimens were collected from mature *katki* 1968 crop on *palas* at Mirzapur.

This is the first record of the association of a Diptera with lac and its role is yet to be determined.

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20. A FLOURISHING COLONY OF *COPTOTERMES HEIMI* (WASM.) (INSECTA : ISOPTERA) IN A NAVAL BOAT

Coptotermes heimi is a serious wood-destroying termite of India (Sen-Sarma *et al.* 1975). It attacks timber structures in building, wooden poles, posts, timbers used in wooden bridges and wood lying in the open. It occurs throughout the Indian subcontinent. It has also been recorded as an introduced species in some parts of South-East Asia (Lever 1952; Gay 1969).

Species of the genus *Coptotermes* normally live in subterranean colonies and maintain soil connection for their sustenance. However, instances are on record where fully established colonies (without, maintaining soil connections) of some species of *Coptotermes* have been reported (Mathur & Sen-Sarma 1959; Sen-Sarma *et al.* 1975). The present note records the establishment of a flourishing colony of *Coptotermes heimi* in a Naval Boat, Bombay without maintaining soil connection. The colony comprised of a primary queen, workers, soldiers and nymphs. This seems to be the first record of a colony of *Coptotermes heimi* in a naval boat in India which remains on the high sea most of the time. The presence of the primary queen leads to the conclusion that the colony was established by the swarming alates presumably during the period when the boat was docked in a dry dock. As the alates are weak fliers, successful landing of alates in the boat in the high sea is ruled out. Subsequent availibility of food, regular source of moisture and other factors were conducive for the establishment of a viable colony. This discovery is important in many respects. It indicates that a colony of *C. heimi* can survive without maintaining soil connection provided a source of moisture is available. It also shows that this species of termites can pose serious problems in sea vessels and is capable of being introduced to other geographical regions. The colony was collected by the Naval Metallurgical Laboratory, Bombay to whom our thanks are due.